DOCUMENT RESUME

ED 143 367 IR 005 153

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TITLE Library-Use Instruction for Engineering Students.
PUB DATE 77
NOTE 11p.

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS College Libraries; *College Students; *Engineering; *Engineering Education; Guidelines; *Library Instruction; University Libraries

ABSTRACT

Instruction for students in the use of libraries and their resources has been neglected in engineering education. Librarians can team teach courses on technical writing and introduce students to the major information scurces in their fields. They can give presentations, publish handbooks, bibliographies, and pathfinders on library resources, and present audiovisual programs for library orientation. Engineering instructors and administrators should realize that library resources are important, and that librarians are willing to work with the instructor in developing instructional programs to improve students' library skills. Advantages of such instruction to students are: (1) they can collect background information more efficiently; and (2) they have the opportunity without undue dependence on a instructor's guidance. A list of 13 hints on conducting a literature search, modified from University of Nebraska at Omaha courses to be more universal, is attached. (Author/KP)

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LIBRARY-USE INSTRUCTION FOR ENGINEERING STUDENTS

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ABSTRACT

Instructing engineering students in the use of the libraries and their resources has been a neglected part of engineering education. Currently, libraries are instituting instructional programs to help the students use libraries effectively. This paper lists some hints to the engineering students in conducting library searches.

In engineering education, library-use instruction is probably one of the most neglected areas. Instructors do not bother to teach students about the use of the library because they believe that it is either trivial or the students are expected to know without instruction. Many librarians (and to some extent even the instructors) know that this is not always true. Students usually stumble through the library and are reluctant to seek out the librarians to ask for assistance. This usually results in a loss of students' time and much wasted effort. In the same way a student needs training in the use of laboratory equipment, he or she needs training in the efficient use of the libraries. The more one knows about the resources of the libraries, the easier it would be to manipulate them to suit a need.

One way for students to learn to use libraries is through courses such as "technical writing" or by doing term papers. By insisting on a good bibliography, and by examining the manner in which the student collected the information in the library, faculty can make the students aware of the vast amount of information accessible within and without the library and how to go about finding it.

In conducting these courses, engineering educators should call upon the often underutilized source - librarians. Librarians, more than any one else, are aware of the students' lack of library-use skills, the time wasted

by them in the library because they are not fully aware of the library's resources and the inferior methods they use in collecting information. Librarians are making every effort to make students and faculty aware of this problem.

In many instances, librarians are willing to team teach courses such as 'technical writing' and introduce students to major sources of information in their fields and the best methods of collecting the information. Other techniques being used by librarians include giving presentations to students at the invitation of the classroom instructors, publication of handbooks, bibliographies and other pamphlets on the resources of their libraries, and slide/tape and other audio-visual programs which orient the students to the library resources. Some engineering libraries use point-of-use instructional materials. For example, if a student wants to know how to use the Engineering Index, there may be an audio-cassette, or slides, or even a set of printed instructions located by the side of the index. The student may consult these instructions before using the index. Similarly, librarians have devised 'pathfinder exercises' which instruct students in systematically locating major sources of information (such as indexes, abstracts, bibliographies, handbooks, textbooks) on their topics. Of course, almost all the libraries have

reference areas where librarians are available to give students individual attention and help them compile bibliographies for their papers or other assignments.

Engineering instructors and administrators should realize that their libraries are much more than collections of books and periodicals. Librarians are often willing to work with engineering instructors to develop suitable library-instructional programs for their students. Although librarians try to reach all the faculty members, it is impossible to personally contact every individual. Instructors should take initiative and contact the librarians for information on available programs and possibility of starting new ones.

The advantages of a library-use instruction to the students are: (1) students can collect background information for their term papers or laboratory experiments more efficiently; and (2) students will have an opportunity for self-instruction without unduly depending on the guidance of their teachers. Of course, it is hoped that they will be able to turn in better quality reports and papers.

Following is a set of suggestions which faculty might present to their students who are compiling bibliographies for term papers. These instructions were originally prepared for the students of 'technical writing' courses taught at the University of Nebraska at Omaha, but were modified to make them more universal.

HINTS ON CONDUCTING A LITERATURE SEARCH

1. Clearly define the topic on which you are planning to write a paper. If you choose too narrow a topic, you may not find much material in your library. If you choose too broad a topic, you will have too much to cope with.
2. To get general ideas on your topic, first read textbooks and/or encyclopedia articles in the subject area. The McGraw-Hill Encyclopedia of Science and Technology is a good starting point. In addition, there are encyclopedias and handbooks in different areas of engineering (eg. Encyclopedia of Polymer Science and Technology and Civil Engineering Handbook) which provide background information on a given topic.
3. As you go through the encyclopedia article or a textbook chapter, you can do two things. You can build a vocabulary of terms used in connection with the topic. (Note the variations in spelling, synonyms, broader terms, narrower terms and other variations in terminology.)

Searching the card catalog, periodical indexes, abstract journals will be easier if you have a good control of the vocabulary. Secondly, you can scan the references cited and choose those which are useful for your topic for further examination.

4. (a) Next, find out what books your library has on your subject. From the previous step, you may know the names of some authors and the titles of their books. See if they are listed in your library's catalog. Do not stop here. Go to the subject card catalog to find if there are more books on your topic. First check under the most specific term or terms and then gradually broaden the search. For example, if you are searching for information on 'Airport lighting,' check to see if there is such a heading in the subject catalog. If there is none, check under its variation, eg. 'Airports-Lighting.' Information on this topic may be found under the related headings such as: Airports; Airports-contracts and specifications; Airports-Design and construction; Airports-Equipment and supplies; Airports-Laws and regulations; Airports-Runways; Airways-Lighting; Landing aids (Aeronautics): Runway localizing beacons; Beacons; Lighting; Electric lighting. Of course, as you go from a specific to a broader heading, you will find less and less detailed information on your topic. (Also the number of

headings you decide to look under depends on the length of the paper required, time available, type of your library, etc.)

(b) To help you choose the appropriate headings, many libraries display the book Library of Congress Subject Headings at the catalog. There are also thesauri of engineering terms which are useful in building an engineering vocabulary.

(c) In a typical college library, books are scattered in a number of locations - eg. reserve, reference, oversized books. Familiarize yourself with your library.

5. Check to see if there are any bibliographies on your topic. A good recent bibliography will reduce the time you have to spend in searching the literature. Book-length bibliographies will be listed in the card catalog under the subjects such as 'Engineering-Bibliography;' 'Building-Bibliography.' Other bibliographies can be located through sources such as Bibliographic Index.
6. Many sources of information are not accessible through the card catalog. One such example is periodical articles. In many libraries, publications issued by United States government are housed separately and may not be listed in the catalog. Check with the reference librarian for information on such special collections and pamphlet files.

7.(a) References to engineering journal articles on your topic can be collected by using periodical indexes and abstract journals. For engineers, Engineering Index, and Applied Science and Technology Index are excellent starting points.

(b) Information in recent periodicals may not be reported in indexes and abstracts. Browse through the current issues of the periodicals in your subject area.

8. (a) Many federal agencies publish engineering information and their output varies from tips for consumers to professional publications. The major source for finding out what has been published by the federal government is the Monthly Catalog of United States Government Publications.

(b) Technical reports are another type of federal publications. These are research reports released by the federal agencies, contractors and grantees. The information provided in them may not appear elsewhere. Many engineering libraries will have a collection of these reports. If your library does not have them, your librarian will suggest how to get hold of them. In any case, these technical reports are listed in the Government Reports Announcements & Index.

9. You may also be interested in finding out if anybody has written a doctoral thesis on your topic. If you are, check the Dissertations Abstracts International. Its Section B lists science and engineering theses.

10. Check if your library has access to computer data bases. Many of these data bases are supplied by Lockheed and Systems Development Corporation. Searching these computer data bases will make compiling a bibliography much easier.
11. It is likely that your library may not have some of the books, articles, government documents, etc. which you want to consult. In such a case, you may get them through your library's Interlibrary Loan Department.
12. Finally, personal communication plays an important part in collecting scientific and technical information. It may be worthwhile to contact companies, government agencies, teachers and practicing engineers. It is also a good idea to maintain a personal file of reprints of articles whcih have appeared in professional and trade journals and to keep track of papers read in conferences.
13. The above steps are general guidelines for conducting a library search on an engineering topic. In the actual search, you may have to skip some steps and modify others, depending on your knowledge of the subject and the amount of information you need. The best thing is to make an appointment to talk with a reference librarian before undertaking the library search. He or she will suggest the most appropriate steps to follow for your topic.